

AP[®] BIOLOGY
2003 SCORING GUIDELINES (Form B)

Question 4

Biologists are interested in preserving the diversity of living organisms on the planet.

(a) **Explain** THREE of the following processes or phenomena, using an appropriate example for each.

- Mutation
- adaptive radiation
- polyploidy
- population bottlenecks
- growth of the human population

(b) For each process or phenomenon you selected in (a), **discuss** its impact on the diversity of life on Earth.

One point for each definition, example, impact and explanation.

	Definition	Example	Impact on diversity of life on earth	Explanation
mutation	change in DNA	deletion/insertion point mutation chromosomal aberration	increase or decrease	altered proteins new geno/phenotypes raw material for selection
adaptive radiation	multiple species from 1 ancestor	Galapagos finches mammals angiosperms	increase	new species co-existence of species
polyploidy	more than 2 complete chromosome sets	plants (common) animals (rare e.g., fish, amphibians)	increase	development of new species (autopolyploidy speciation, allopolyploidy speciation)
population bottlenecks	sudden/dramatic decrease in population size (usually natural)	cheetahs northern elephant seals	decrease	random/not adaptive population not representative of original smaller gene pool
growth of human population	near carrying capacity exponential evidence from age pyramid	rapid increase – developing countries slow growth - U.S. no growth - Italy	decrease	Use of resources leads to extinction of other species